

THE OFFICE ACTION

In the final Office Action issued on February 22, 2006, the Examiner rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,122,024 to Molsen et al. ("Molsen").

REMARKS

Applicants have carefully considered the final Office Action. Applicants respectfully request reconsideration of the application in light of the following comments.

The Examiner rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Molsen. Applicants respectfully traverse.

Molsen is directed to a switchable liquid crystal device including a cell containing a helical polymer network and a nematic liquid crystal, and including electrodes are provided for applying a field across the cell to switch between different optical states. A "mask" may be used to during the polymer network forming stage to form multiple "picture elements" having different helical pitches. As described with reference to Figures 1-3, a light absorbing layer 7 is used to absorb light that is transmitted through the cell.

Despite the Examiner's assertions, Molsen is related to the present invention in only the most general of ways. In this respect, the Examiner states in the office action that "As to claim 1, Molsen is drawn to a switchable liquid crystal devices. Molsen teaches and discloses, in reference to Figure 1, a cell defined between alignment layers...with a first cell wall...spaced from a second cell wall...electrodes disposed on facing surfaces...of the first and second walls." Applicants submit that the above statement accurately describes ANY switchable liquid crystal cell device. That is, the Examiner is simply stating that Molsen teaches the most basic structure of a liquid crystal cell and then goes not to state that Molsen "does not explicitly specify in so many words" the most important limitations of the present invention. Applicants submit that it is precisely these features that Molsen "does not explicitly specify" that differentiate and render the present invention novel. The Examiner appears to be attempting to gloss over these critical features while emphasizing the most basic features of Molsen that make it like EVERY OTHER PRIOR ART SWITCHABLE LC CELL.

In this regard, Molsen does teach a liquid crystal device having polymer walls, with an electric field used to switch the optical state. However, as pointed out in the prior Response, a device such as taught by Molson is NOT a diffraction grating. Such a device could only function as a diffraction grating if the polymer network follows a periodic structure. The only way such a structure could be produced in the device of Molsen would be by applying a light absorbing layer to the cell prior to polymerization. The present device does not utilize a light absorbing layer. Rather, the periodic array of convection rolls, which functions as a diffraction grating, arises spontaneously upon application of the electric field.

Furthermore, and as previously pointed out, a diffraction array made according to Molson would NEVER be tunable (as recited in our claim 1, i.e. "a tunable diffraction grating") because the periodicity of any diffraction grating thus formed must be specified by the light absorbing layer (as detailed above) which CANNOT BE CHANGED AFTER IT IS IN PLACE. In contrast, and as detailed on page 8, lines 3-16 of the application, both the grating constant and the structure factor can be tuned in the present invention, with the structure factor tunable after formation of the polymeric network by varying the application of the electric field. The Examiner cannot simply ignore the limitation that the present diffraction grating is tunable.

The Examiner admits that Molson does not disclose forming "an array of liquid crystal rolls", which is by far the most important difference between the present invention and Molson. The similarities the Examiner points out in the subsequent paragraph of page 4 of the Office Action are essentially details common to any number of liquid crystal devices.

For example, the Examiner notes that "Molsen does in fact teach and disclose...means for switching the cell between a first optical state and a second optical state different from the first." However, the Examiner will appreciate that these two optical states are a reflective and a non-reflective mode (see col. 5 generally). Neither of these states corresponds to the diffraction grating function of the present invention.

With regard to the Examiner's position that it would be obvious to form the convective rolls in the invention of Molsen, Applicants continue to disagree with this argument. In fact, one would never "form said array of convective rolls at

least for the reasons as set forth in Molson" to form a broadband reflector. In this respect, one skilled in the art of liquid crystals would immediately recognize that the reflective properties of the invention taught by Molson come from the helices induced in the liquid crystal, whereas the selective reflective properties of the present invention come from the periodic array of the convective rolls.

Molsen's teaching does not extend to causing the convective rolls to form. The Examiner appears to be taking the position that Molsen would inherently possess an array of convective rolls because it has a polymerizable mixture and a switching means in the cell. In this respect however, the Examiner is simply incorrect in her statement that it may be understood to one skilled in the art that there is an array of convective rolls in the invention of Molsen. Rather, said rolls only form with the appropriate choice of nematic liquid crystal properties, as detailed on page 5, lines 8-14 of the present application, and appropriate choice of frequency and amplitude of the applied electric field. Molsen give no indication that that these appropriate materials and conditions are a concern or that such rolls are subsequently formed.

As the Examiner will appreciate however, inherency must be a necessary result, not merely a possible result. *In re Oelrich*, 212 USPQ 323 (CCPA 1981); *Ex parte Keith*, 154 USPQ 320 (POBA 1961). See also, *In re Robertson*, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999).

In relying on a theory of inherency, the Examiner must provide a basis in fact or technical reasoning to support the determination that the allegedly inherent characteristics necessarily flow from the teachings of the prior art. *Ex parte Levy*, 17 USPQ2d 1461 (BPAI 1990). Here, the Examiner has failed in this burden of showing that Molsen would necessarily have convective rolls. That is, as detailed above, said rolls only form with the appropriate choice of nematic liquid crystal properties, as detailed on page 5, lines 8-14 of the present application, and appropriate choice of frequency and amplitude of the applied electric field.

In the "Response to Arguments" section of the office action, the Examiner makes a confusing statement that "it is noted that the features upon which applicant relies...are not recited in the rejected claim(s)...Applicant has not claimed the necessary critical properties and frequency and amplitude for the formation of said rolls."

Applicants submit that regardless of the truth of the assertion that the properties under which the rolls are formed are not claimed, it has no bearing on the present §103 rejection. That is, Applicants have claimed a device having an array of convective rolls. As shown, such rolls are not inherent in any switchable LC cell having a polymerized mixture, but instead are only formed under the appropriate conditions. Molsen not only fails to disclose or suggest such rolls, it fails to disclose or suggest these conditions. Thus, the feature upon which the Applicant relies (i.e. an array of convective rolls) ARE recited in the claims.

If the Examiner believes that the conditions under which the rolls are formed need to be in the claims (an assertion the Applicants deny), then the proper rejection would be under §112, NOT §103. Molsen simply fails to disclose or suggest the convective rolls or the conditions under which such rolls form. Thus, a prior art rejection under §103 is inappropriate and must be withdrawn.

CONCLUSION


In view of the foregoing comments, Applicants submit that claims 1-7 are in condition for allowance. Applicants respectfully request early notification of such allowance. Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned to attempt to resolve any such issues.

If any fee is due in conjunction with the filing of this response, Applicants authorize deduction of that fee from Deposit Account 06-0308.

Respectfully submitted,

**FAY, SHARPE, FAGAN,
MINNICH & MCKEE, LLP**

Date: May 19, 2006



Joseph E. Waters, Reg. No. 50,427
1100 Superior Avenue
Seventh Floor
Cleveland, OH 44114-2518
216/861-5582